

# **SHUTTER**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the invention:**

5           The present invention relates to shutters and, more particularly, to such a shutter, which effectively blocks outside light.

### **2. Description of the Related Art:**

          A shutter generally comprises a frame fixedly fastened to the window opening, and a panel pivotally fastened to the frame by pivoting means for swinging the frame in  
10   and out of the frame.

          Because the panel is comprised of a number of parts (top and bottom blocks, two vertical side strips, a set of louvers, and a control rod), it cannot be made subject to the size of a particular window opening. Therefore, manufacturers provide shutter panels of limited specifications. During installation, fixedly fasten the frame to the  
15   window opening, and then select the shutter panel having the size approximately equal to but slightly smaller than the frame, and then hinge the shutter panel to one jamb of the frame by pivoting means. When installed, a gap is produced between the shutter panel and the other jamb of the frame. Through the gap, outside light and dust may pass to the inside of the room. Further, the gap destroys the sense of beauty of the shutter.

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## **SUMMARY OF THE INVNEION**

          It is the primary objective of the present invention to provide a shutter, which reduces the gap produced during installation.

          It is another objective of the present invention to provide a shutter, which  
25   effectively blocks outside light when closed and, causes a sense of beauty.

To achieve these objectives of the present invention, the shutter comprises a shutter frame defining an open space; a shutter panel mounted within the open space of the shutter frame and having a panel frame and a plurality of louvers pivotally mounted inside the open panel frame; a mounting device having a first member and a second member hinged to the first member, the first member and second member of the mounting device being respectively fixedly fastened to an outer side edge of the panel frame of the shutter panel and an inner side edge of the shutter frame for enabling the shutter panel to be turned in and out of the open space of the shutter frame; and a packing plate mounted in between the mounting device and the shutter frame.

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#### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is an exploded view of a shutter according to the first preferred embodiment of the present invention.

FIG. 2 is a sectional view of the shutter according to the first preferred embodiment of the present invention.

FIG. 3 is an exploded view of a shutter according to the second preferred embodiment of the present invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to FIGS. 1 and 2, a shutter **100** in accordance with the first preferred embodiment of the present invention is shown comprised of a shutter frame **10**, a shutter panel **20**, two mounting devices **30**, and two packing plates **40**.

The shutter frame **10** is a rectangular open frame fixedly fastened to the four sides of a window opening (not shown), comprising top and bottom rails **11**, and left and right jambs **12**. The rails **11** and the jambs **12** define an open space **13**

corresponding to the window opening. One jamb **12** of the frame **10**, namely, the left jamb has a shielding flange **14** longitudinally disposed at an inner side edge thereof facing the open space **13** and in flush with the outer surface. Further, the rails **11** and the jambs **12** have a decorative design at the respective inner surface facing the inside of the  
5 room.

The shutter panel **20** comprises a panel frame **21**, a plurality of louvers **22**, and a control rod **23**. The panel frame **21** is a rectangular open frame for accommodating the louvers **22** and the control rod **23**, comprising a top block **211**, a bottom block **212**, a left side strip **213**, and a right side strip **214**. The louvers **22** are  
10 respectively pivotally connected between the side strips **213** and **214** and arranged in parallel between the top and bottom blocks **211** and **212**. The control rod **23** is set in vertical within the panel frame **21** and pivoted to one side edge of each louver **22** such that moving the control rod **23** in vertical direction adjusts the tilting angle of the louvers **22** between a horizontal position and a vertical position to open/close the shutter  
15 **100**.

The mounting devices **30** according to this embodiment are hinges, each having a first member **31** and a second member **32** pivotally fastened together. The first and second members **31** and **32** each have three circular mounting holes **33**. Fastening members, for example, screws or the like are mounted in the circular mounting holes **33**  
20 of the first members **31** of the hinges **30** and threaded into the left side strip **213** of the shutter panel **20** to fixedly secure the hinges **30** to the outer side edge of the left side strip **213** of the shutter panel **20** at different elevations. The left side strip **213** carrying the hinges **30** corresponds to the jamb **12** having the shielding flange **14**.

The packing plates **40** are flat plate members fitting the contour of the second  
25 members **32** of the hinges **30**, having a predetermined thickness. The number of the

packing plates 40 is equal to the mounting devices 30. Further, each packing plate 40 has three mounting holes 41 corresponding to the circular mounting holes 33 at the second members 32 of the hinges 30.

The mounting procedure of the shutter 100 is outlined hereinafter. At first, the shutter frame 10 is fixedly fastened to the four sides of the window opening (not shown), and then the shutter panel 20 is put in the open space 13 within the shutter frame 10, keeping the hinges 30 aimed at the jamb 12 having the shielding flange 14, and then the packing plates 40 are respectively put in between the second members 32 of the hinges 30 and the jamb 12 having the shielding flange 14, and then fastening members are respectively mounted in the circular mounting holes 33 of the second members 32 of the hinges 30 and the mounting holes 41 of the packing plates 40 and threaded into the jamb 12 having the shielding flange 14 to fixedly secure the hinges 30 to the jamb 12 having the shielding flange 14. Due to the installation of the packing plates 40 in between the he second members 32 of the hinges 30 and the jamb 12 having the shielding flange 14, the gap A between the shutter panel 20 and the jamb 12 without the shielding flange 14 is reduced, i.e., the shutter panel 20 is moved to the right (reversed to the side carrying the hinges 30) at a distance equal to the thickness of the packing plates 40. Further, the installation of the packing plates 40 relatively increase the gap A' between the shutter panel 20 and the jamb 12 having the shielding flange 14. However, because the width of the shielding flange 14 is greater than the total thickness of one packing plate 40 and the two members 31 and 32 of one hinge 30, the shielding flange 14 stops outside light from passing through the gap A'.

As indicated above, the thickness of the packing plates fills up the gap between the shutter frame and the shutter panel. Therefore, the outside light is blocked, and the sense of beauty of the outer appearance of the shutter is enhanced.

The aforesaid first preferred embodiment of the present invention discloses a single open shutter. The invention can also be employed to a dual open or bi-fold shutter to reduce the gap between the shutter frame and the shutter panel so as to increase the sense of beauty of the shutter and to effectively block outside light.

5           FIG. 2 shows a shutter **200** constructed according to the second preferred embodiment of the present invention. Similar to the aforesaid first preferred embodiment, the shutter **200** is comprised of a shutter frame **50**, a shutter panel **60**, a plurality of mounting devices **70**, and a plurality of packing plates **80**. The only difference is at the design of the packing plates **80**. According to this embodiment, each  
10 packing plate **80** has a longitudinal mounting slot **81**. By means of the longitudinal mounting slot **81**, the position of each packing plate **80** can be vertically adjusted relative to the corresponding mounting device **70** before fixation.